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Abstract

The different forms of religious unbelief are still much of an open question. Using data (N=4404) from three European countries, Finland, Denmark and the Netherlands, we sought to identify underlying unbeliever groups among those with the strongest disbelief in God (N=2258). Latent class analyses were conducted on the non-theistic supernatural beliefs of this subsection of participants, resulting in the same three unbeliever groups in each country: analytic atheists, spiritual but not religious (SBNR) and uncertain nonbelievers. Next, we explored these groups on a variety of dimensions, especially on the group members' attitudes to religion, certainty of beliefs, cognitive dispositions, and world view. One-way ANOVAs revealed similarities as well as distinct characters for each of the latent groups. The groups differed most in intuitive thinking style, over-mentalizing bias and other ontological confusions. To compare the latent groups to all other individuals who took part in the study, two discriminant analyses were run with all participants. This resulted in four meaningful dimensions that supported and extended the ANOVAs findings and allowed for the consideration of other (non)believers. Overall, this study supports earlier findings on analytic atheists and SBNR while also providing new information about their dispositions. Interestingly, the uncertain nonbeliever group has been largely unexplored previously and it should gain more attention in future studies.

Key words: Atheism; Nonbelievers; Spiritual but not religious; Cognitive dispositions; Attitudes towards religion

Religious Unbelief in Three Western European Countries: Identifying and Characterizing Unbeliever Types Using Latent Class Analysis

Empty churches and an increasing number of people with no religious affiliation have made religious unbelief a major and lively topic in the study of religion. Unbelief is a complicated subject, illustrated in the diverse and fuzzy labeling of unbelievers (e.g. atheists, agnostics, irreligious, secular, nonreligious and nonbelievers), often with overlapping connotations. Moreover, the absence of religious beliefs most probably takes distinct forms in different cultures and individuals, but empirical studies are still few and the forms of unbelief are poorly understood. Given that unaffiliated or ‘nones’ is the second largest group among Western Europeans, right after Christians (Pew Research Center, 2018), understanding the varieties of religious unbelief is highly important.

In this study, we use the terms unbelief and unbelievers as umbrella terms for those who lack belief in a God. A key question to start with in the study of unbelief is what kind of unbelievers are there? Some researchers have begun to examine this question, and the results show that unbelievers can differ in their personality types (Baker & Robbins, 2012), philosophical orientations (Schnell, 2015), their sources of finding meaning in life (Schnell & Keenan, 2011), and the ways in which they understand religious unbelief and identities (Silver, Coleman, Hood, & Holcombe, 2014). Social background and cognitive profile have also been theorized to account for distinct forms of atheism, such as analytic atheism, i.e., unbelief due to strong analytic thinking, and incredulous atheism, i.e., unbelief due to a lack of relevant religious input (e.g., Kalkman, 2014; Norenzayan & Gervais, 2013). Reflecting the early stages of research in this area, these descriptions are based on isolated studies, which makes them difficult to integrate theoretically.

In the present study, we aim to form a clearer and broader understanding of religious unbelief. We examine unbelievers across three countries, Denmark, Finland, and the

Netherlands. In these countries, only 17% - 24% believe in God as described in the Bible, while 24% - 34% of people do not believe in any higher power (Pew Research Center, 2018), which makes them ideal testbeds for exploring the different forms that unbelief could take. The purpose of the study is twofold. We will first identify different groups of individuals who report a lack of belief in God. Next, we will comprehensively portray these unbeliever groups with various psychological characteristics. Because of the broad topic and scarcity of previous research, the study is highly exploratory.

Identification of Distinct Unbeliever Types

One of the main challenges in profiling different unbelievers in empirical studies concerns the basic criteria for distinguishing religious unbelievers from each other. So far, scholars have divided unbelievers into subgroups based on, for example, participants' religious affiliations (Willard & Norenzayan, 2017), affiliation and God beliefs (Baker & Smith, 2009), and self-reported religious identities (Silver et al., 2014). In this study, however, we identify unbeliever types based on their supernatural beliefs and lack thereof.

It is important to identify unbelievers in terms of their supernatural beliefs because belief in supernatural phenomena is a key characteristic of all religions, and labels such as theist, atheist, agnostic, and nonbeliever, as well as most theories about religiosity (e.g., as within the cognitive science of religion and evolutionary accounts of religion), are based around the common theme of supernatural beliefs. Yet, considerations of supernatural have usually been implicit and indirect, and empirical studies on religious unbelievers' supernatural beliefs are scarce (for specifying the concept 'supernatural', see Lindeman & Svedholm, 2012). In other words, if one has no supernatural beliefs at all, one cannot be religious. However, not all supernatural beliefs are religious, and consequently, one can be a religious unbeliever and still have supernatural beliefs. We use the term supernatural beliefs here to refer to 1) religious supernatural beliefs (in this study, belief in God), 2) such supernatural

beliefs which are often but not necessarily linked with God beliefs (e.g., afterlife), and 3) supernatural beliefs which are not typically religious (e.g., telepathy).

Although systematic studies on unbelievers' supernatural beliefs are still missing, research on spiritual but not religious individuals (Saucier & Skrzypińska, 2006; Willard & Norenzayan, 2017) and New Age believers (Bainbridge, 2004; Farias, Claridge, & Lalljee, 2005) clearly shows that religious disbelief does not necessarily imply disbelief in other supernatural phenomena such as telepathy or astrology. Analyzing unbelievers' supernatural beliefs allows us to examine how absolute unbelievers (who reject every supernatural belief) and more selective unbelievers (who reject only some supernatural beliefs) are represented in our data.

In order to identify varieties of unbelief, we use latent class analysis (LCA, Muthén & Muthén, 2000) to classify unbelievers, rather than using a priori categories such as religious non-affiliation or self-reported religious identification. LCA is a statistical modeling technique which reveals hidden categories by grouping individuals so that individuals in one category are like each other and different from individuals in other categories.

Characterization of Unbeliever Types

The other aim of this study is to characterize the unbeliever groups identified by LCA. Most scholars in the field of religion agree that we know far too little about what different unbelievers are like (Lee, 2014; Quack, 2014; Silver et al., 2014). To advance theoretical knowledge and empirical clarity, we will utilize research on attitudes because attitude research has a long history in analyzing people's states of mind towards socially significant affairs, as well as their determinants and consequences. In this study, we portray the unbeliever groups identified by LCA by their attitudes towards religion, and by their cognitive characteristics, world views, religious identity, family background and affiliations. Figure 1 shows the various constructs we included in the study.

INSERT FIGURE 1 ABOUT HERE

Attitudes toward religion. Attitudes have two major dimensions, valence (positive – negative evaluation) and strength. Attitude strength has several subdimensions and they can weaken or enhance an attitude's impact (Sawicki & Wegener, 2018). We address the following strength dimensions because they have proven to be the most important and consequential in shaping thinking, belief persistence, and behavior (Barden & Tormala, 2014; Howe & Krosnick, 2017): extremity (extreme vs. neutral evaluation of religiousness), intensity (how much religions and people's religiosity activates emotions), ambivalence (the degree to which a person holds positive and negative evaluations of religiosity simultaneously), elaboration (the degree of thought one has given to the merits and shortcomings of one's attitudes toward religion), interest (how much one finds religious issues and religiosity stimulating and thought-provoking), correctness (how certain one is that one's attitudes toward religion are the correct way of thinking), and importance (how much one attaches significance to one's attitudes toward religion). In addition to these attitudes toward religion, we also assess respondents' attitudes about the importance of religion and science, as well as respondents' perceived level of conflict between religion and science.

Although unbelievers' attitudes have not been systematically examined, attitude-related terms are often used in the description of various unbelievers. For example Norenzayan and Gervais (2013) describe 'apatheism' as indifference to religious agents and practices, found for example in cultures that are characterized by existential security. In attitude terms, they describe how social background brings forth neutral evaluation, weak interest and low importance of religion (cf., Figure 1). Similarly, forms of atheism such as aggressive and assertive anti-theism (Silver et al., 2014) can be conceptualized to differ on the dimensions of attitude evaluation and strength, and to have effects on behavior.

Cognition. One important cognitive characteristic of at least some unbelievers is expected to be analytic thinking and its associates: Ample evidence shows that religious beliefs decrease with analytic thinking style and cognitive reflection (Gervais & Norenzayan, 2012; Pennycook, 2014), that religious beliefs increase with intuitive thinking (Shenhav, Rand, & Greene, 2012), and that religious beliefs are related to cognitive biases such as dualism, over-mentalizing, and other ontological confusions (Banerjee & Bloom, 2014; Demertzi et al., 2009; Lindeman, Svedholm-Häkkinen, & Lipsanen, 2015; Pennycook, Cheyne, Barr, Koehler, & Fugelsang, 2015; Willard & Norenzayan, 2013). In line with these findings, Norenzayan and Gervais (2013) describe one form of religious disbelief, 'analytic atheism', as arising from analytic cognitive strategies that overrule the intuitive biases that support religious belief (see also Kalkman, 2014, for a similar characterization of 'reflective atheists') While analytic atheists are proposed to inhibit the intuitive biases that support religious beliefs, a different group of nonbelievers, called 'mind-blind atheists' (Norenzayan & Gervais, 2013) is suggested to have intuitive difficulties in understanding religious agents; arising from deficits in social cognition, associated usually with autistic traits. Although the evidence for the relationship between nonreligiosity and autistic traits is so far weak or even absent (Maij et al., 2017; Reddish, Tok, & Kundt, 2016; Schaap-Jonker, Sizoo, van Schothorst-van Roekel, & Corveleyn, 2013), we will examine how social cognitive impairment, and cognitive styles and biases, relate to various unbeliever types.

Unbelievers may also differ in their views on the nature of knowledge and on the accepted justifications for knowing and believing, that is, in their epistemic stance. Consider for example the concepts of agnosticism, an "ideology entailing the belief that nothing is known or can be known of" versus atheism, "a belief in the non-existence of a God or gods" (Bullivant & Lee, 2016). Because systematic studies on epistemic beliefs in individuals with differing views of religious tenets are missing, we examine unbelievers' epistemological

views about knowledge and about arguments. Views on the nature of knowledge can vary on the continuum from simple to complex (Schommer-Aikins, 2004). Views of arguments can vary from beliefs that assertions are either correct or incorrect to beliefs that assertions are judgments that can be evaluated according to criteria of argument and evidence (Kuhn, Cheney, & Weinstock, 2000).

World view. Because both nonreligious individuals (Saroglou, Delpierre, & Dernelle, 2004) and spiritual but not religious individuals (Saroglou & Munoz - García, 2008; Saucier & Skrzypińska, 2006) value traditions less than religious individuals, we explore whether non-traditionalism is typical for all or for only some types of unbelievers. We also examine beliefs related to free will and determinism, and people's perception of the mind as a bounded vs. a porous entity (van Elk, 2018). Religious believers tend to differ in their free will beliefs, with some believing that everything that happens in the world is ordained by God, while others believe humans are inherently free to choose (van Elk, Rutjens, & van Harreveld, 2017). Relatedly, a key characteristic of religious and spiritual beliefs is to view the human mind as a porous entity, through which communication with the divine is possible (e.g., through prayer or worship).

Affiliation, identification, and social background. Some unbeliever characteristics will be explored in less detail. First, because the terms such as agnostic, atheist, and nonreligious can be understood in several ways (Lee, 2014), we examine which self-identifications and affiliations are typical in the different unbeliever groups. We will also examine whether the unbeliever groups differ in terms of parents' religiosity. The role of parents and other social models in adopting or discarding supernatural beliefs has recently been emphasized in theories of "credibility-enhancing displays" (e.g., Lanman & Buhrmester, 2017). Correspondingly, one type of atheism, 'InCREDulous atheism', has been specified as

indifference towards religiosity deriving from absence of exposure to credible displays of faith in God or gods (Norenzayan & Gervais, 2013).

The Present Study

In sum, the study has two aims. The first purpose is to identify latent unbeliever groups based on respondents' supernatural beliefs. Second, these unbeliever groups will be described in terms of attitudes towards religiosity and religion, cognitive styles and biases, epistemic stance, world view, parents' religiosity, religious identification and religious affiliation.

Method

Participants

The participants were 4404 individuals from Denmark, Finland and the Netherlands (48.2% female, 49.4% male, 1.2% other). Their ages varied between 18 and 84 ($M = 39.7$, $SD = 14.2$), and full-time occupation was studying (17.3%), working (60.4%), or other (20.7%). The participants' educational background was as follows: compulsory school (2.7%), some high school (7.4%), completed high school or equivalent (23.0%), some university/college (23.8%), completed university/college (36.1%), some postgraduate work (2.6%), and completed a postgraduate degree (3.2%). Missing answers explain why the accumulative percentage is less than 100%.

Religious affiliations were none (68.1%), Lutheranism (20.7%), Catholicism (3.2%), Orthodox (0.5%), Islam (0.7%), Hinduism (0.2%), Buddhism (0.4%), Judaism (0.2%), or other (3.9%). The participants chose their religious identity based from given alternatives as follows: atheist (29.5%), unbeliever (10.2%), agnostic (explained by the phrase "I believe that the existence of God cannot be proven or disproven", 11.8%), nonbeliever (17.9%), secular (3.7%), religious believer (8.7%), spiritual but not religious (8.2%), spiritual seeker (5.1%), and other (4.9%).

Subjective socioeconomic status (SES) was assessed with a 10-point scale (Adler, Epel, Castellazzo, & Ickovics, 2000). The participants were instructed to regard their life in terms of a ladder, where people with the most money, the highest level of education and the most appreciated jobs are at the top (score = 10), and people with the least money and education and the least valued jobs are at the bottom (score = 1). The participants were asked where they would place themselves on the ladder compared to other Finnish (Danish, Dutch) people. The most common levels were 7 (26.1%) and 8 (20.0%). The other responses were divided as follows: Level 1 = 0.7%, 2 = 2.3%, 3 = 6.0%, 4 = 8.0%, 5 = 12.3%, 6 = 17.1%, 9 = 5.4%, and 10 = 1.1%.

The main analyses were conducted with participants who strongly disagreed with the statement 'I believe in God' (see below). They were 2258 individuals (mean age = 39.3, range 18 - 80 years), 40% were female, and their full-time occupation was studying (15.8%), working (65.1%), or other (19.1%). Their education, SES, and religious affiliations and identifications are described in the results section.

Procedure

The study was conducted online in Finland, Denmark and the Netherlands, and in all three countries the data was collected in ca. 3 weeks. The participants were told that the study investigates how people think about religious beliefs, unbelief, science and knowledge. A hyperlink to the questionnaire was included in the message.

In Finland (N=2268) and Denmark (N=1208) the participants were recruited to the online study via several Facebook group pages (e.g., the Finnish Association of Skeptics, the Danish Atheist Society, the Danish Humanist Society). In addition, two twitter accounts, several university and open university student mailing lists, and a pool of participants who had expressed interest in taking part in our studies, were used in Finland. In the Netherlands (N=928) two different samples were taken: one group of participants (N = 293) consisted of

Dutch first-year psychology students and the other group of participants (N = 635) was recruited via an online research agency with access to a representative panel (N ~ 100.000) of Dutch participants.

No compensation was offered to the Danish participants. In Finland all participants were promised feedback about their view of the world profile, which was based on the participants' responses on some of the scales included in the survey (i.e., values and supernatural beliefs, thinking styles, and views about religiosity, knowledge and science). In the Netherlands psychology students participated in exchange for course credits and the other group of respondents participated in exchange for a small financial remuneration.

Materials

For every scale in the study: If a participant had 25% or more missing items on a scale, the sum variable for that scale was not calculated for that participant. Some sum variables had a skewness or kurtosis $> |1|$. Because using the log10-transformation of these variables did not change the results, all analyses were conducted with the original variables.

Supernatural beliefs and certainty. The participants were asked to rate their agreement (1 = *strongly disagree*, 5 = *strongly agree*) with the following nine statements: “I believe in God”, “I believe in life after death”, “The universe originated from intelligent design”, “The universe has an ultimate purpose”, “I believe in fate”, “There is spiritual energy in the universe”, “In the universe, everything is connected in a way that cannot be explained scientifically”, “Telepathic mind reading is possible”, and “I believe in angels”. These beliefs were selected to represent currently held supernatural beliefs, including both religious beliefs as well as other supernatural beliefs recently observed among non-religious people (Bainbridge, 2004; Ecklund, Park, & Sorrell, 2011; Flere & Kirbiš, 2009; Garfield, Drwecki, Moore, Kortenkamp, & Gracz, 2014; Järnefelt, Canfield, & Kelemen, 2015; Schofield, Baker, Staples, & Sheffield, 2016). Participants’ responses to these statements were used to conduct

the LCA to identify the different groups of unbelievers according to their different supernatural beliefs (see Results).

After each belief question, the question “How certain are you about your response”, with the options “uncertain” (1), “somewhat uncertain” (2), and “certain” (score 3), was presented, resulting in nine certainty responses, respectively. (Because we also measured response times to be examined in another study, the belief and certainty question for spiritual healing were presented first as practice items.)

Attitudes towards religion. Attitudes toward religion were originally assessed with seven 3-item subscales. The scales of *evaluation*, *extremity ambivalence*, *interest*, *importance*, and *elaboration* had good reliabilities (α 's = .70 - .89). Because the reliabilities of intensity and correctness subscales were low (α 's < .50), and because one elaboration item lowered the subscale's reliability, we used the following statements as single-item measures: "How strong are the positive emotions that religions provoke in you?" (*positive emotions*) and "How strong negative emotions do religions provoke in you?" (*negative emotions*) from the intensity subscale; and "How certain are you that your attitudes toward religion reflect the right way to think about religious issues?" (*correctness*), "Could you consider changing your attitudes toward religion?" (*considering change*), and "Do you think other people should have similar attitudes toward religion as you?" (*other people*) from the correctness subscale. All questions were answered with a 5-point scale with appropriate response alternatives, such as 1 = *no*, 5 = *very much*; 1 = *very difficult*, 5 = *very easy*; 1 = *never*, 5 = *very often*. For a more detailed description of the attitude scales, see Supplementary material.

Besides addressing the subjective importance of one's own attitudes toward religion (described above), participants' views about the importance of religion and science were assessed. We used the "Importance of science" subscale from a questionnaire measuring attitudes towards science and technology (Kind, Jones, & Barmby, 2007). We modified the

statements so that both perceived *importance of science* ($\alpha = .96$) and *importance of religion* ($\alpha = .87$) could be assessed with similar statements (e.g., “The benefits of religion [‘science’ in the other scale] are greater than its harmful effects”). The participants indicated their level of agreement to the items on a 5-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*).

Finally, participants' views on the *conflict between religion and science* were assessed by presenting the statement "Religion and science are not in conflict with each other" with three answer options (1 = *agree*, 2 = *moderately agree*, 3 = *disagree*).

Cognition.

Analytic and intuitive thinking. To assess *cognitive reflection*, we used the new version of the Cognitive Reflection Test (Frederick, 2005), CRT-2 (Thomson & Oppenheimer, 2016). CRT-2 includes four items, such as “If you’re running a race and you pass the person in second place, what place are you in?”. The number of correct responses was used as an index of cognitive reflection.

In addition, *need for cognition* (a.k.a. analytic thinking style) and *intuitive thinking styles* were assessed with a 6-item Need for Cognition scale ($\alpha = .72$) and with a 5-item Faith in Intuition scale ($\alpha = .74$). The items were derived from the 10-item Faith in Intuition scale (FI) and from the 12-item Need for Cognition scale in the Rational/Experiential Multimodal Inventory (REIm, Norris & Epstein, 2011). Example items are "I enjoy problems that require hard thinking" and "I like to rely on my intuitive impressions" (1 = *strongly disagree*, 4 = *strongly agree*). The criteria for item selection is described in the Supplementary material.

Social cognitive impairment. Deficits in social cognitive skills were assessed with the Social skills dimension from the Autism Spectrum Quotient (AQ-short; Hoekstra et al., 2011). The scale ($\alpha = .77$) includes 7 four-point items (1 = *strongly agree*; 4 = *strongly disagree*), for example “I find social situations easy” (reversed).

Core knowledge confusions. We used 14 statements from the Core Knowledge Confusions scale ($\alpha = .82$, Lindeman et al., 2015). Example statements are "Force lives in the universe" and "House knows its history". The participants were asked to rate on a 5-point scale whether the statements were fully metaphorical (1) or fully literal (5). They were given an example of literally true ("Mozart was a composer") and only metaphorically true ("Friends are the salt of life") statements before rating the items. The scale also included six filler items, three metaphorical (e.g., "Howling wind is a flute") and three literal ("Flowing water is liquid").

Over-mentalizing. Over-mentalizing was assessed by asking participants to evaluate 23 words on the basis of characterizing them as mental or non-mental ($\alpha = .92$; 1 = *Not at all mental*, 4 = *Mental*). The instruction also specified that "By mental we mean anything that has some kind of psyche or spirit, or something which has mental properties. For example, thoughts are mental and human beings are mental beings. Many people also consider God to be a mental being. A pen or a car, by contrast, is generally considered non-mental". The stimulus words were physical processes, lifeless matter, artificial objects, or living but inanimate phenomena (e.g., electricity, water, paper and moss). The fillers, included to obscure the meaning of the scale, were abstractions, animates or mental phenomena (e.g., justice, fish, goal). For details of the scale, see Lindeman & Svedholm-Häkkinen (2016).

Dualism. We measured to what extent participants endorsed a dualistic or a monistic conception of the human mind and body by using a variant of the inclusion-of-other-in-the-self scale (Aron, Aron, & Smollan, 1992). Participants were presented with 7 (Denmark and the Netherlands) or 5 (Finland) pairs of circles with the words 'body' and 'soul'. The circles differed in their degree of overlap from almost completely overlapping to being completely isolated. They were instructed to select the picture that 'according to you best represents the relation between the body and the mind', resulting in a score between 1 (= strong dualist

conception) and 7 or 5 (= strong monist conception). We rescored the scales from the Dutch and Danish data, to allow for a direct comparison between countries.

Epistemic stance. *Views of arguments* were assessed by the modified Epistemic Understanding Questionnaire (EUQ, Kuhn et al., 2000). Our version of the EUQ ($\alpha = .80$, Lindeman & Lipsanen, 2017) included ten pairs of contrasting claims, attributed to two individuals, originally named Robin and Chris (the names were replaced with Finnish, Danish and Dutch names). An example item is: “Robin thinks people should take responsibility for themselves. Chris thinks people should work together to take care of each other”. The participants were told that “both can have some rightness” and then asked, “can one have a better or more correct view than the other?” The response options were “One could not be more right than the other” (reflecting a lower level of epistemological understanding, scored as 1) and “One could be more right” (reflecting a higher level, scored as 2).

Views of knowledge questionnaire included eight items ($\alpha = .70$), modified after the items in the Epistemic Beliefs Inventory (Schraw, Bendixen, & Dunkle, 2002) and the Epistemological Questionnaire (Schommer, 1990). An example items is: “Things are simpler than most experts would have you believe”. The participants were asked if they agreed with the items (1 = *strongly disagree*, 5 = *strongly agree*).

World view.

Values. The five values that have been shown to differentiate religious people from unbelievers (Schwartz & Huismans, 1995) were assessed by selecting the corresponding value items from the Short Schwartz’s Value Survey (Lindeman & Verkasalo, 2005). The participants were asked to rate the importance of the following values as a life-guiding principle for them on an 8-point scale (0 = *Opposed to my principles*, 8 = *Supreme importance*): hedonism (e.g. gratification of desires, enjoyment in life, self-indulgence), stimulation (e.g. daring, a varied and challenging life, an exciting life), self-direction (e.g.

creativity, freedom, curiosity, independence, choosing one's own goals), tradition (e.g. respect for tradition, humbleness, accepting one's portion in life, devotion, modesty), and conformity (e.g. obedience, honoring parents and elders, self-discipline, politeness).

Free will and scientific determinism. The Free will ($\alpha = .83$) and Scientific determinism ($\alpha = .72$) subscales from the FAD-Plus (Paulhus & Carey, 2011) were used. Both scales consist of 7 statements answered on a 5-point scale (1=*strongly disagree*, 5= *strongly agree*). Example items are “People can overcome any obstacles if they truly want to” (Free will) and “Your genes determine your future” (Determinism).

Porous mind. The Porous theory of mind scale (van Elk, 2018) consists of four metaphors representing the human mind as a bounded (e.g., ‘The human mind is like a box full of secrets and only you have the key to open it’) vs. a porous entity (e.g., ‘The human mind is like an internet router, transmitting and perceiving thoughts and feelings’). Participants indicated to what extent they thought the statement provided an accurate description of the human mind (1 = *completely disagree*, 5 = *completely agree*; $\alpha = .71$).

Parents' religiosity. Parents' religiosity was assessed with two questions, one asking if the participant's mother is/was religious, the other asking about father's religiosity. The response options were: "No", "To some extent", "Yes", and "I don't know".

Results

Identification of the Unbeliever Types

To identify different God unbeliever types, latent class analyses with one latent variable were run based on the seven supernatural beliefs. Only participants who strongly disagreed with the statement "I believe in God" (N = 2258) were included in the analyses. The analyses were conducted with Mplus, and the model fit was estimated by the Akaike Information Criterion (AIC), the Bayesian information criterion (BIC), a sample-size adjusted BIC (aBIC), and entropy. A good-fitting model has a small AIC, BIC, and aBIC (indicating

parsimonious models) and high entropy (indicating precision in assigning participants into appropriate classes). For comparing models with different numbers of classes, we used the Vuong–Lo–Mendell–Rubin likelihood ratio test.

The fits from a 1-class model to a 7-class model were estimated (Table 1). The best-fitting model was the three-class model: Three latent classes of unbelievers, with similar type of supernatural belief profiles, were observed in the three countries. The Vuong–Lo–Mendell–Rubin likelihood ratio test indicated that adding a fourth class did not significantly improve the model.

INSERT TABLE ABOUT 1 HERE

Based on the characteristics and religious self-identifications of the latent group members (described below), we labeled the unbeliever groups as spiritual but not religious (SBNR, 3.7% of all unbelievers), analytic atheists (81.7%), and uncertain nonbelievers (14.6%). We also checked the relative proportion of the three latent groups in a subsample from the Netherlands because this subsample was representative of the entire Dutch population. Although the absolute sizes were somewhat different, the relative sizes of the groups were like those in the full data set: In the representative subsample, 12.6% of those who did not believe in God (score = 1) were in the SBNR group, 55% were analytic atheists, and 32.5% were uncertain nonbelievers.

Figure 2 shows the means of the supernatural belief variables in the three unbeliever groups. Supernatural beliefs among religious believers (those who agreed or strongly agreed that they believe in God, $N = 499$) are included in Figure 2 only for comparison, they were not included in the LCA. The figure shows that analytic atheists had practically no supernatural beliefs. Uncertain nonbelievers, in turn, scored medium and the spiritual group scored high on most supernatural beliefs. For detailed information about the LCA results in the three countries, see Table S1 and the Supplementary Material.

INSERT FIGURE 2 ABOUT HERE

Characterization of the Unbeliever Types

Most of the comparisons were conducted with analyses of variance (ANOVA). Multiple ANOVAS are more appropriate than MANOVAs when the research being conducted is exploratory in nature, and when some or all of the outcome variables have previously been studied in univariate contexts (e.g., Huberty & Morris, 1989). To guard against the inflated probability of type 1 error, the analyses were conducted using both False discovery rate (Benjamini & Hochberg, 1995) and Bonferroni correction.

One-way ANOVAs were used to analyze the potential differences in the certainty of responses to the belief questions between the three unbeliever groups (Table 2). Correcting for type 1 error rate did not change the interpretation of the results so original unadjusted p-values are presented in Table 2. Bonferroni correction was applied separately for the dependent variables presented in Table 2. The critical level of significance after Bonferroni correction was 0.0017.

The main findings can be summarized as follows: Analytic atheists were more certain than the two other unbeliever groups of most of their (un)beliefs. Uncertain nonbelievers, in contrast, were more uncertain than the two other unbeliever groups of their belief in God, afterlife, spiritual energy and connected universe.

INSERT TABLE 2 ABOUT HERE

The characteristics of the members in the three groups were analyzed next. First, we looked at the affiliations, religious identifications and other background variables in the three unbeliever groups. Most of the group members had no religious affiliation (SBNR 75.3%, analytic atheists 92.3%, and uncertain nonbelievers 85.1%) or they were Lutheran (SBNR 11.8%, analytic atheists 5.8%, uncertain nonbelievers 8.3%). Of the nine possible religious self-identification options, SBNR individuals selected most often the option ‘spiritual but not

religious' (37.6%) or nonbeliever (23.7%). Analytic atheists chose 'atheist' (52.2%) or 'nonbeliever' (18.9%), and uncertain nonbelievers chose 'nonbeliever' (29.3%) or atheist (25.9%).

Analytic atheists were more often men (63.7%) than women; SBNR (75.3%) and uncertain nonbelievers were more often women (58.9%) than men, $\chi^2(4) = 133.52, p < .001$. Compared to SBNR ($M = 28$ years) and uncertain nonbelievers ($M = 24$ years), analytic atheists were older ($M = 32$ years), $F(1,2555) = 67.08, p < .001$, more educated, $\chi^2(7) = 58.70, p < .001$, and they had higher SES, $\chi^2(9) = 27.12, p = .001$. The groups did not differ in mother's or father's religiosity, $\chi^2(4) = 2.44, p = .66$, and $\chi^2(4) = 3.48, p = .48$.

Next, gender differences in all attitudinal, cognitive, epistemic and world value variables were analysed. Although several ($p < .001$) significant differences were found, even the strongest effect size was small ($\eta p^2 = .06$): women's evaluations of religiosity were more positive ($M = 2.72, SD = 0.96$) than men's evaluations ($M = 2.22, SD = 0.97$), $F(1,4166) = 273.39, p < .001$. Because of the small effect sizes, gender was not included in the following analyses.

To examine differences between the three latent groups further, one-way ANOVAs were conducted with attitudinal, cognitive, epistemic and world value variables as dependent variables (Table 3). Again, correcting for type 1 error rate did not change the interpretation of the results and original unadjusted p-values are presented in Table 3. Bonferroni correction was applied separately for the dependent variables. The critical level of significance after Bonferroni correction was 0.0017. The table shows that analytic atheists, spiritual but not religious, and uncertain nonbelievers did not differ in their interest in religious issues, views of arguments, willingness to consider changing their attitudes toward religion, perceived importance of science and religion, dualism, scientific determinism, or in hedonism, self-direction and stimulation. The table also shows that the biggest differences between the

groups were the following: SBNR group scored highest and analytic atheists scored lowest on core knowledge confusions, over-mentalizing biases, and intuitive thinking style; analytic atheists scored highest and uncertain nonbelievers scored lowest on the perceived correctness of one's attitudes toward religion, and analytic atheists had a higher need for cognition than the others. Because of the large number of significant differences, we address the other differences in the Discussion.

INSERT TABLE 3 ABOUT HERE

Dimensions Differentiating All Participants

The above results raised three interrelated questions. First, the analyses were conducted only with those who strongly disagreed with the statement 'I believe in God'; How do these participants then differ from other unbelievers, namely those who only moderately disagreed with the statement? Second, since the characteristics of the SBNR group were similar to those of religious people (see Introduction), how do they differ from each other? And third, how do unbelievers' attitudes toward religion and other characteristics compare to those of all other participants?

To answer these questions, we conducted two discriminant function analyses with all participants, who were a priori grouped (see below). Discriminant analysis provides latent dimensions, called discriminant functions, which are linear combinations of the variables along which the groups differ (comparable to principal components). The analysis also provides the means of the groups on these dimensions (comparable to participants' scores on the principal components).

We grouped the participants based on the item "I believe in God", which was assessed with a 5-point scale (1 = *strongly disagree*, 5 = *strongly agree*). Accordingly, seven groups were included in the analyses: SBNR, analytic atheists and uncertain nonbelievers (all of whom scored 1), and those who scored 2, 3, 4, or 5.

The first analysis was conducted with variables assessing attitudes toward religion, and the second was conducted with cognitive, epistemic, and world view variables. Only variables where differences between the seven groups, analyzed with ANOVA, were at least of medium effect size ($\eta_p^2 \geq .06$, $ps < .05$) were included.

In the first analysis (Table 4), six significant functions ($ps < .01$) were found. However, the last four functions added less than 1 % to the explained variance and they revealed no important information about group differences. The first discriminant function, explaining 76.5% of the variance, was named Positive but ambivalent attitudes toward religion, based on the variables that had highest loadings on the dimension (see Table 4). The second function, named Extreme and determined attitudes toward religion, explained 21.4% of the variance.

The second analysis (Table 4) revealed five significant functions ($ps < .01$) but only the first (explaining 88.9% of the variance) and the second (8.4%) included useful information about group differences. The first dimension was named Cognitive biases, intuition, and conservatism, and the second dimension was named Traditional values.

The seven groups had different mean scores on all dimensions (the lower part of Table 4). Because of space limits, we describe these results in the Discussion.

INSERT TABLE ABOUT 4 HERE

Discussion

The purpose of this study was to portray different types of religious unbelievers. Specifically, we were interested in identifying God unbeliever types, based on their (un)beliefs in other supernatural phenomena, and to characterize these groups in terms of several cognitive, personality and social characteristics. Three similar unbeliever groups were found in each country, Denmark, Finland and the Netherlands. Based on the characteristics and religious self-identifications of the group members, we labeled the groups as analytic atheists, spiritual but not religious individuals, and uncertain nonbelievers.

In some respects, the members of the three groups were like each other. Although the group members neither had very positive attitudes toward religion nor considered changing their attitudes, they were all moderately interested in religious issues. They also assessed the importance of science and religion in the same way, regarding science as more important than religion. In addition, no group differences were found for mother's or father's religiosity, for a deterministic world view, for views of arguments, or for the values of hedonism, stimulation and self-direction. Finally, although analytic atheists considered their attitudes toward religion more important than the others, these attitudes were not very important to any of the groups. Nevertheless, the differences between the groups were more apparent than the similarities, as discussed below.

Analytic Atheists

Analytic atheists were the largest unbeliever group. They were more often men than women, they had a somewhat higher level of education and self-reported socioeconomic status, and they were slightly older than the other unbelievers.

Otherwise, this group was a textbook case of atheists: Compared with the other two unbeliever groups, they scored higher in cognitive reflection, they relied less on intuitions and more on an analytic thinking, and they exhibited least core knowledge confusions and over-mentalizing biases. These are cognitive characteristics that have predicted religious unbelief in a host of earlier studies (e.g., Demertzi et al., 2009; Lindeman et al., 2015; Pennycook, 2014; Shenhav et al., 2012; Willard & Norenzayan, 2013). The group also corresponds well with the outlines of an atheist type labeled as analytic atheists (Norenzayan & Gervais, 2013) or reflective atheists (Kalkman, 2014). However, the present results extended this well-known image of a prototypical atheist in several ways.

First, analytic atheists had practically no supernatural beliefs; they did not believe in angels or telepathy, for example. Compared to SBNR and uncertain nonbelievers, analytic

atheists were the most certain of their supernatural unbeliefs. They saw more conflict between science and religion, valued conformity and traditions less, believed less in free will, and their epistemological beliefs were more developed since they regarded knowledge as more complex and uncertain. Furthermore, analytic atheists' attitudes towards religiosity were more negative and extreme, more elaborated, less ambivalent, and emotionally more intense. They found it easier to explain their attitudes toward religion to other people, and they thought that their attitudes reflect the right way to think about religious issues.

In addition, analytic atheists scored positively on the dimension describing extreme and determined attitudes toward religion. The analyses with all participants showed that only those who strongly agreed with the statement 'I believe in God' scored higher, and that no other participant groups endorsed extreme and determined attitudes toward religions. Based on what we know about strong attitudes (reviews: Barden & Tormala, 2014; Howe & Krosnick, 2017), it is possible that analytic atheists and strongly religious individuals are the groups whose attitudes toward religion may boost emotional reactions and action, that are the most resistant to persuasion, and who will thus be the least likely to revise or change their beliefs during their lifetime. It is thus also possible that compared to other atheists, analytic atheists can be characterized as firm atheists

Spiritual But not Religious Individuals

Spiritual but not religious individuals, the smallest of the three unbeliever groups, believed moderately or strongly in all other supernatural phenomena except God. These findings are in line with earlier studies showing that belief in supernatural phenomena explain most of the variance in self-reported spirituality (Lindeman, Blomqvist, & Takada, 2012; see also, Willard & Norenzayan, 2017). SBNR individuals were more often women than men and less educated than the other two groups. Their attitudes toward religion were moderate and weak: They had the less negative, less extreme and less determined attitudes toward religion

than analytic atheists or uncertain nonbelievers. They did not think that other people should have similar attitudes toward religion as they have, and they were least certain that their attitudes towards religiosity are correct. They also saw less conflict between religion and science than the two other unbeliever groups. Furthermore, spiritual but not religious participants endorsed stronger belief in free will, which could be related to a stronger endorsement of afterlife beliefs (e.g., obtaining rewards by performing good deeds). In line with previous studies (van Elk, 2018), they also viewed the human mind more as a porous entity than a bounded entity, which implies the possibility of direct communication with the supernatural (e.g., hearing voices of supernatural agents etc.).

With respect to cognitive characteristics, SBNR individuals were the opposite to analytic atheists: Compared to analytic atheists or uncertain nonbelievers, they relied on intuitive thinking in everyday life, they regarded the nature of knowledge as simple, they made more mistakes in the cognitive reflection test, and they exhibited more confusions of core knowledge and over-mentalizing biases. These results extend findings showing that such cognitive biases as dualism and anthropomorphism are typical for SBNR individuals (Willard & Norenzayan, 2017).

As a whole, the dispositions describing SBNR in this study were the same dispositions that have described religious individuals in earlier studies (e.g., Demertzi et al., 2009; Lindeman et al., 2015; Pennycook, 2014; Shenhav et al., 2012; Willard & Norenzayan, 2013). The question is, then, what are the differences and similarities between these two groups? The discriminant analyses provided some answers. First, SBNR individuals had less positive, but also less extreme and less determined attitudes toward religion than strongly religious individuals. Second, both SBNR and religious individuals were equally high on the dimension consisting cognitive biases, intuitive thinking style, low need for cognition, porous mind, and traditional values. In contrast, SBNR were lowest and strongly religious individuals were

highest on the dimension which included only traditional values. These results confirm earlier findings that SBNR have more liberal values than religious individuals (Saroglou & Munoz - García, 2008; Saucier & Skrzypińska, 2006), and add to them by demonstrating that SBNR and religious people have a common cognitive profile.

Uncertain nonbelievers

The uncertain nonbeliever group was medium in size, average in supernatural beliefs, and they differed from analytic atheists and SBNR in that they had more doubts. Uncertain nonbelievers were the most hesitant group in their (un)beliefs in God, afterlife, spiritual energy, and the connected universe. Furthermore, like SBNR, they were more uncertain than analytic atheists of their (un)beliefs in intelligent design, purpose, fate, and telepathy.

Uncertain nonbelievers' indecision was also expressed in their attitudes: Together with SBNR, their attitudes toward religion were more ambivalent, more difficult to explain to other people, and less elaborated than analytic atheists' attitudes. In cognitive profile, traditional values, free will and porous mind, uncertain nonbelievers were between the analytic atheists and SBNR.

These results raised questions about the differences between uncertain nonbelievers and other religious disbelievers. Remember that like analytic atheists and SBNR, uncertain nonbelievers strongly disagreed with the item 'I believe in God'. If the nonbelievers were uncertain of their beliefs and attitudes, why did they not choose the options 'disagree' or 'in between', like other nonreligious individuals? Taking all results together, it seems that although nonbelievers' key characteristic was their uncertainty about their religious and other supernatural beliefs, their attitudes toward religion and religiosity were nevertheless more negative and not as moderate and undetermined as those of other nonreligious individuals. This new and interesting class of unbelievers approximates uncertain and ambivalent

nonreligious identities observed by (Lee, 2015), and it should be studied in more detail in future.

Limitations

We used data from three countries, Denmark, Finland, and the Netherlands. Although these countries are not secular (they have state religions), religion is private and typically not pervasive in people's everyday life, and being nonreligious is a socially accepted worldview (Zuckerman, 2012). Future studies should therefore replicate these findings in different countries, for example in the USA, where religion has much more power and where atheism is socially less acceptable. Future studies should also determine whether the same unbeliever groups can be identified across different populations if other supernatural belief items are used as classification criteria. In addition, addressing different characteristics (e.g., socio-political attitudes, levels of societal activism, personality traits, or social environmental variables) might yield additional important information about various unbeliever types.

The relative overrepresentation of analytical atheist may be related to our sampling strategy. We explicitly advertised the survey as a study on religious beliefs, and recruited among members of groups and organizations that were interested in religious beliefs. Unbelievers who are less interested in religion may either have lacked the motivation to respond to our survey, or be underrepresented in our sampling frame. This explanation, however, fails to explain why the Dutch representative sample showed a similar ratio between the three groups as in the other two countries

A concern might be that the scales and items that we used might have been interpreted in different ways, especially in the three countries that were included in this study. Also, we did not test for cross-cultural equivalence of our survey. In addition, the effect sizes were relatively small, though the groups differed strongly on their explicit beliefs in supernatural phenomena. However, the overall pattern of results was consistent and robust across all

different measures and constructs that we used, and across all three countries that were included. Thus, although many differences between our groups were nuanced, they appeared still consistent and meaningful.

Our purpose was to map the domain of religious unbelief as broadly as possible in one study, and therefore only approximate assessments could be used. More sophisticated methods should be used in future, especially for epistemic cognition and social cognitive impairment which were here assessed only shortly.

Although the data obtained by on-line surveys have been shown to be of at least as good quality as data obtained by traditional methods (e.g., Gosling, Vazire, Srivastava, & John, 2004), a common method bias may challenge the results. Moreover, we labeled the unbeliever groups ourselves, and it is likely that the labels analytic atheists, SBNR and uncertain nonbelievers do not reflect all group member's self-identifications. To address these challenges, we shall proceed with analyzing the present data based on the participants' religious self-identifications and by analyzing their implicit supernatural beliefs.

Finally, one limitation of the present study is the a-theoretical approach, reflecting a pronounced lack of coherent theory of unbelief. Besides its fundamental function of description, a good scientific theory should parsimoniously explain why the constructs are related, it should place limits on what is useful to look at, it should integrate the diverse findings in the field, and generate further hypotheses (Gelso, 2006). At the same time, following the empirical cycle, theory formation goes hand in hand with exploratory data analyses, which in turn can lead to the formulation of more precise hypotheses for a confirmatory approach (Wagenmakers, Wetzels, Borsboom, van der Maas, & Kievit, 2012). As such we hope that our multifaceted description of religious unbelievers adds to the literature by laying the ground for theory formation of religious unbelief.

Implications

The results have several implications for future research on religious unbeliefs. First, of the three unbeliever types we identified, analytic atheists and spiritual but not religious individuals are well-known, but the uncertain nonbeliever group is less-known. As (Lee, 2014) has noted, generic nonreligious identifications are important indicators of the advance of nonreligious cultures and yet remain a somewhat vague category. Thus, the prevalence and characteristics of nonbelievers who are uncertain of their religious beliefs should be examined further in future studies.

Analytic atheists formed a large majority of the unbelievers. Similar observations have also been reported earlier. In Silver et al.'s (2014) study, the largest group was “academics”, in Wilson, Bulbulia, and Sibley's (2014) study, it was “undifferentiated skeptics”, and in Aarnio and Lindeman's (2007) study, the largest group was “skeptics”, which are all close to the present analytic atheist group based on their characteristics. The present SBNR group, in turn, was very small, not only in the whole sample but also in the representative subsample from the Netherlands.

The possibility that different supernatural beliefs represent a unitary construct could account for the differences in group sizes. Convincing evidence for the multidimensionality of supernatural beliefs does not exist (Irwin, 2009), and accordingly, it has been found that people who believe in one supernatural phenomena tend to also believe in others (Orenstein, 2002; Wilson et al., 2014, but see Rice, 2003). This could explain why specifically three unbeliever groups were identified, and why there was a hierarchy regarding the amount of supernatural beliefs, with analytic atheists being the lowest, followed by uncertain nonbelievers, and lastly by SBNR. In other words, the intertwining of different supernatural beliefs may explain the large number of analytical atheists who had no supernatural beliefs and the small number of SBNR people, who strongly rejected God but held several other supernatural beliefs. Because we focused on a sample that explicitly rejected belief in God, it

is only natural that most respondents reported a lack of belief in other supernatural phenomena and that those with inconsistent beliefs were in a minority. SBNR people were also most uncertain about the correctness of their religious attitudes, perhaps reflecting the difficulty of entertaining unbelief while at the same time believing in other supernatural phenomena. Considering these observations, and the several ways SBNR can be defined, future studies should explore the key characteristics of spiritual but not religious individuals and examine if the emphasis in the literature on this group has been exaggerated.

Many previously discussed unbeliever types could not be identified. One of the most cited categorizations of religious disbelievers, based partly on theory and partly on empirical studies, makes a distinction between analytic atheism, incredulous atheism, apatheism, and mind-blind atheism (Norenzayan & Gervais, 2013). Of them only analytical atheists were identified in this study. Incredulous atheism and apatheism refer to indifference towards religious agents and practices. These types of unbelievers are assumed to be prevalent in cultures that are characterized by existential security (apatheism) or where there is a relative absence of exposure to credible displays of faith in God (incredulous atheism). Although the unbelievers in this study came from such cultures, and they did not differ in parents' religiosity, they were not indifferent but averagely interested in religious issues. Moreover, mind-blind atheists were not identified, replicating earlier studies (Maij et al., 2017; Reddish et al., 2016; Schaap-Jonker et al., 2013). Although analytic atheists scored higher than uncertain nonbelievers and SBNR on the scale of social-cognitive impairment, overall, they scored low and the effect size was weak.

The way we categorized participants into groups may have simplified information about dispositions that all participants have to some degree. However, as evinced in this study, categorization can reveal important but unpredictable qualitative differences and similarities between participant groups: Participants who responded similarly or almost similarly to the

statement 'I believe in God', differed sometimes considerably in their characteristics and attitudes towards religion. Likewise, participants who responded differently, or even in opposing ways, had sometimes surprisingly similar attitudes or characteristics. It is hence important to remember that religious (un)beliefs, and the relationships between these beliefs and their determinants and outcomes, do not necessarily increase or decrease linearly.

The study also shows that attitude research can be useful for expanding future research on religious beliefs and unbeliefs. Drawing on attitudes research, and making a distinction between attitudes and their correlates, enabled us to clarify and simplify the diverse attributes and terms that have been used to describe various forms of religious unbelief. Attitude theories include several widely validated hypotheses about issues that could be studied in future, for example the ways attitudes toward religion are formed and how they predict behavior and intergroup relations.

Finally, religious unbelief indicated here either an overall lack of supernatural beliefs, or an endorsement of nonreligious supernatural beliefs, possibly substituting organized religions. Believing in supernatural has its own distinct etiology, reflected also in the findings that the three unbeliever groups differed most in intuitive thinking style, over-mentalizing bias and other ontological confusions. This twofold manifestation of religious unbelief should be acknowledged in future theory and research in the field.

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Figure Captions

Figure 1. Variables by which the observed unbeliever groups are characterized in this study (in italics). The superordinate variables (capitalized) describe sources and consequences of most attitude objects with one exception: while beliefs are central components of attitudes, they are here differentiated from attitudes because the study does not focus on attitudes towards the belief objects (e.g., God).

Figure 2. Supernatural Beliefs Among the Three Latent Group Members (Analytic Atheists, Uncertain Nonbelievers, and Spiritual but Not Religious) and Among Participants Who Reported Believing in God.

Data availability statement

The data that support the findings of this study are available from the corresponding author, ML, upon reasonable request.